# CLAIMS

1. An evaporator and condenser unit for use in distilling a liquid, the evaporator and condenser unit comprising:

a housing having an inlet and an outlet; and

a heat exchanger plate disposed within the housing and configured for rotation about an axis, the heat exchanger plate having a plurality of folds and two opposing edges that are joined together so as to give the folded plate a generally circular shape, the folds defining a plurality of spaced-apart panels having corresponding surfaces that define alternating evaporating and condensing chambers between opposing panel surfaces, wherein

the evaporating and condensing chambers include inner and outer edges relative to the axis of rotation,

the evaporating chambers are closed at their outer edges by corresponding folds in the heat exchanger plate, are open at their inner edges, and are in fluid communication with the outlet so as to provide vapor thereto,

the condensing chambers are open at their outer edges, are closed at their inner edges by corresponding folds in the heat exchanger plate, and are in fluid communication with the inlet so as to receive vapor therefrom, and

the evaporating and condensing chambers are sealed from each other.

2. The evaporator and condenser unit of claim 1 wherein

a compressor is coupled to the inlet and outlet of the evaporator and condenser unit and the compressor is configured to receive vapor from the evaporating chambers and to deliver compressed vapor to the condensing chambers, and

a motor supplies rotary power to the heat exchanger plate.

3. The evaporator and condenser unit of claim 1 further comprising an upper end plate and a lower end plate disposed within the housing substantially perpendicular to the axis of rotation, the folded heat exchanger plate mounted between the upper and lower end plates so as to seal the evaporating chambers from the condensing chambers.

4. The evaporator and condenser unit of claim 3 wherein the housing includes a lower portion defining a sump containing the liquid to be distilled, the unit further comprising a liquid pick-up mechanism configured to draw liquid from the sump and deliver it to the inner edges of the evaporating chambers.

5. The evaporator and condenser unit of claim 3 wherein the housing includes a lower portion defining a sump containing the liquid to be distilled, the unit further comprising:

a rotating element extending at least partially within the sump and including a wall configured to pick-up liquid from the sump; and

a first stationary scoop tube having an open end disposed near the wall of the rotating element and a section disposed proximate to the inner edges of the folded heat exchanger plate, the section having means for discharging liquid from the sump.

6. The evaporator and condenser unit of claim 5 wherein the section of the tube extends substantially along the axis of rotation and the means for discharging liquid is configured such that liquid enters the evaporating chambers which are open at their inner edges.

7. The evaporator and condenser unit of claim 3 further comprising a sleeve enclosing at least a portion of the folded heat exchanger plate, the sleeve defining a side wall facing the axis of rotation, the sleeve configured such that the side wall traps condensate generated within the condensing chambers.

8. The evaporator and condenser unit of claim 1 further comprising a catch basin disposed in spaced-apart relation about the sealed outer edge of at least one evaporating chamber, the catch basin extending radially inward relative to the axis of rotation a selected distance, and being open in the direction of the axis of rotation.

9. The evaporator and condenser unit of claim 8 wherein a catch basin is disposed about the sealed outer edge of each evaporating chamber.

10. The evaporator and condenser unit of claim 4 further comprising:

a sleeve enclosing the folded heat exchanger plate at least at its outer edges, the sleeve defining a condensate collection space proximate to the folded, heat exchange plate opposite the sump, and

at least one stationary scoop tube extending through the housing and into the condensate collection space, the at least one stationary scoop tube having an opening in the condensate collection space, wherein

the upper end plate has one or more ports disposed proximate to an outer diameter edge of the upper end plate, the one or more ports providing fluid communication between the condensing chambers and the condensate collection space, and

the at least one stationary scoop tube is configured to remove condensate that collects in the condensate collection space.

11. The evaporator and condenser unit of claim 4 further comprising:

a sleeve enclosing the folded heat exchanger plate at least at its outer edges, the sleeve defining a side wall facing the axis of rotation, the sleeve configured such that the side wall traps condensate generated within the condensing chambers; and

a seal ring extending around the outer end of the folded, heat exchange plate between the lower end plate and the sleeve, the seal ring configured to permit fluid communication between the evaporating chambers and the sump, but blocking fluid communication between the condensing chambers and the sump.

12. The evaporator and condenser unit of claim 1 wherein the folds of the heat exchanger plate are substantially co-planar with the axis of rotation.

13. The evaporator and condenser unit of claim 2 further comprising an upper end plate and a lower end plate disposed within the housing substantially perpendicular to the

axis of rotation, the folded heat exchanger plate mounted between the upper and lower end plates so as to seal the evaporating chambers from the condensing chambers.

14. The evaporator and condenser unit of claim 13 wherein the housing includes a lower portion defining a sump containing the liquid to be distilled, the unit further comprising a liquid pick-up mechanism configured to draw liquid from the sump and deliver it to the inner edges of the evaporating chambers.

15. The evaporator and condenser unit of claim 13 wherein the housing includes a lower portion defining a sump containing the liquid to be distilled, the unit further comprising:

a rotating element extending at least partially within the sump and including a wall configured to pick-up liquid from the sump; and

a first stationary scoop tube having an open end disposed near the wall of the rotating element and a section disposed proximate to the inner edges of the folded heat exchanger plate, the section having means for discharging liquid from the sump.

16. The evaporator and condenser unit of claim 1 wherein the heat exchanger plate has a center that is coaxial with the axis of rotation.

17. The evaporator and condenser unit of claim 3 further comprising:

a rotating element extending at least in part from the nominal plane of the lower end plate away from the heat exchanger plate, the rotating element defining a well and configured for receiving a supply of the liquid to be distilled; and

a first stationary scoop tube having an open end disposed at least partially in the well and configured to deliver liquid from the well to the evaporating chambers.

18. A heat exchanger for use in a distiller having a supply of compressed vapor, a liquid to be distilled, and source of rotary power, the heat exchanger comprising:

a heat exchanger plate operatively coupled to the source of rotary power for rotating the heat exchanger plate about an axis, the heat exchanger plate having a plurality

of folds and two opposing edges that are joined together giving the folded plate a generally circular shape, the folds defining a plurality of spaced-apart panels having corresponding surfaces that define alternating evaporating and condensing chambers between opposing panel surfaces, wherein

the evaporating and condensing chambers include inner and outer edges relative to the axis of rotation,

the evaporating chambers are sealed at their outer edges by corresponding folds in the heat exchanger plate, are open at their inner edges, and are in fluid communication with the liquid to be distilled,

the condensing chambers are open at their outer edges, are sealed at their inner edges by corresponding folds in the heat exchanger plate, and are in fluid communication with the supply of compressed vapor, and

the evaporating and condensing chambers are sealed from each other.

19. The heat exchanger of claim 18 further comprising an upper end plate and a lower end plate disposed within the housing substantially perpendicular to the axis of rotation, the folded heat exchanger plate mounted between the upper and lower end plates so as to seal the evaporating chambers from the condensing chambers.

20. The heat exchanger of claim 18 wherein the heat exchanger plate has a center that is coaxial with the axis of rotation.